

6-10-54 57

U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
Division of Forest Insect Research

CONTROL OF GRASSHOPPERS IN A PINE PLANTATION ON
THE SHASTA NATIONAL FOREST
SEASON OF 1954

In the spring of 1952, a 50-acre pine plantation was established in the Coonrad Flat area on the McCloud District of the Shasta National Forest. Previous experience with recent plantings in the general area had shown that grasshoppers caused considerable damage to the planted trees. At the time of planting, indications were that the population of grasshoppers would be high, and plans were made to carry on control through the use of poisoned bran. A supply of the bait was obtained from Tule Lake and scattered over the area late in May. This method of control proved ineffective in that, although many grasshoppers were killed, there still remained a sufficient population to completely strip and kill all of the planted trees.

In the spring of 1953, a 50-acre fire occurred near Coonrad Flat, in an area now known as the Ash Creek Sink Burn. In the last week of April 1954, this area was planted with two-year old ponderosa and Jeffrey pine. Part of the plantings were for experimental purposes. Anticipating grasshopper damage, plans were made to control the insects on the planted areas.

Since poisoned bait had been ineffective in the earlier test, it was decided to try out one of the newer insecticides as a contact and residual agent. Mr. Earle T. Gammon, Economic Entomologist and grasshopper authority of the Bureau of Entomology, California State Department of Agriculture in Sacramento, who was consulted in this matter, advocated the use of dieldrin in diesel oil applied in the form of a fog. The application recommended was 3 ounces of dieldrin in 2 gallons of diesel oil per acre, applied shortly after grasshopper emergence.

Grasshopper Species and Abundance

An examination of the Ash Creek Sink Burn shortly after planting showed that grasshopper nymphs first began to emerge about April 26. On May 3, when the area was again inspected, emergence was well advanced and the grasshoppers appeared to be quite abundant. No feeding on pines was observed on either date. Specimens were collected and taken to the State Department of Agriculture in Sacramento for identification. It was found that two species of grasshoppers were included in the collection. The more common of the two was identified as the yellow-winged grasshopper, Camnula pellucida (Scudder). The other was a small gray grasshopper that could not be identified.

Method of Control and Timing of the Spray

At the time the grasshoppers were identified, Mr. Gammon advised that the spray be applied as soon as possible, before they started to feed on the pine trees. The date of the spraying was then set for May 13. The original intention was to apply the spray with the Buffalo turbine blower belonging to the Division of Range Management, Regional Office, U. S. Forest Service, but since this was not

available arrangements were made/ ^{with} Lee Sherwood of Willows to spray the area by plane. The total area treated was 70 acres, which was comprised of the 50 acres planted plus a 100-foot buffer strip around the periphery of the planting, amounting to an additional 20 acres. The cost of aerial application of 140 gallons of spray to this area was \$150. A Super Cub equipped with a spray boom was used by the operator to apply the spray. The width of the spray swaths was about 50 feet, with two flagmen assigned to guide the pilot in the spray application. The airport used for the job was the Mott Field, about midway between Mount Shasta and Dunsmuir.

Checking the Results of Control

Chemically-treated "jump" cards were spaced at about 1/4-chain intervals at right angles to the line of flight from boundary to boundary, just prior to treatment. These showed very uniform coverage without a single one being missed by spray. A sample of one of these cards is attached. Within a few minutes after the spray was applied to an area, the grasshoppers and other insects became very active and apparently were almost immediately affected by the dieldrin. When the last load of spray was applied, samples of grasshoppers and other insects were collected and taken to the Hat Creek Field Base for observation. Samples were placed in screened cages and their status checked after 22 hours. It was found that all of the 15 specimens of the small gray grasshoppers collected were dead. Of the 30 specimens of the yellow-winged grasshoppers, three, or 10 per cent, were dead; 21, or 70 per cent, were almost completely paralyzed, and six, or 20 per cent, were noticeably affected. Four leafhoppers, one weevil and two ants were in the collection, and these were all dead.

One week after the spray had been applied, a check of the area was made by Ranger R. S. McBride of the McCloud District, Shasta National Forest, and S. S. Smith, Grasshopper Specialist, Agricultural Research Service, U. S. Department of Agriculture. These men were unable to find a single living grasshopper in the treated area, although grasshoppers were very abundant in the general area adjacent. From this, it appears that the treatment was very effective and that the planted pine should escape injury unless there is a major migration of grasshoppers into the treated area from the outside. It is expected that the insecticide will have a residual effect for at least six weeks. If immigration should occur after the residual action wears off, it might be necessary to apply another spray, particularly to the test plots.

This area will be checked periodically during the summer for evidence of a buildup of grasshopper populations in the treated area.

Berkeley, California
June 10, 1954

R. C. Hall
Entomologist